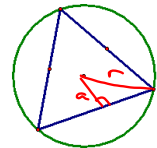
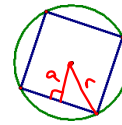
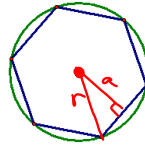


11-3 Areas of Regular Polygons and Circles

Any regular polygon can be inscribed in a circle.

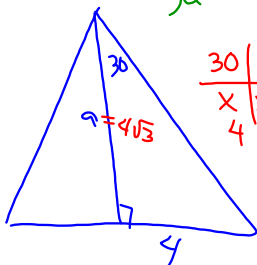
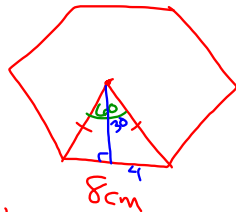
Radius--from center to vertex

Apothem--from the center and perpendicular to one side



$$\text{Area} = \frac{1}{2} a p$$

example 1:
regular hexagon
side = 8 cm



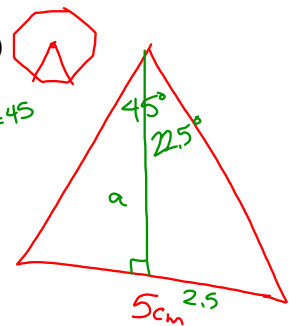
30	60	90
x	x\sqrt{3}	2x
4	4\sqrt{3}	8

$$A = \frac{1}{2} 4\sqrt{3} \cdot 48$$

$$A = 96\sqrt{3} \text{ cm}^2$$

$$\text{Area} = \frac{1}{2} a p$$

example 2:
regular octagon
side = 5 cm



SOHCAH(TOA)

$$\tan 22.5 = \frac{2.5}{a}$$

$$a \cdot \tan 22.5 = 2.5$$

$$a = \frac{2.5}{\tan 22.5} \approx 6.0$$

$$A = \frac{1}{2} 6.0 \cdot 40$$

$$A \approx 120.7 \text{ cm}^2$$

Area = $\frac{1}{2} a p$

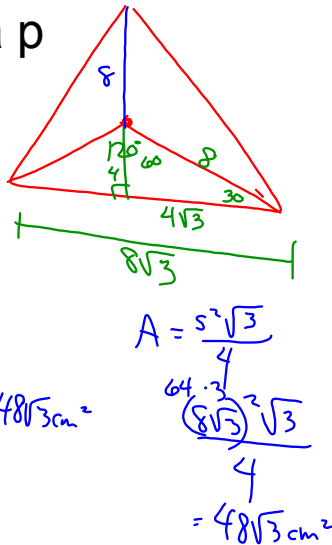
example 3:
regular triangle
apothem = 4 cm

$$A = \frac{1}{2} 4 \cdot 24\sqrt{3}$$

$$A = 48\sqrt{3} \text{ cm}^2$$

$$A = \frac{1}{2} b h$$

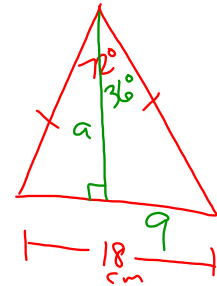
$$\frac{1}{2} 8\sqrt{3} \cdot 12 = 48\sqrt{3} \text{ cm}^2$$

Area = $\frac{1}{2} a p$

example 4:
regular pentagon
perimeter = 90 cm

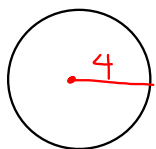
$$\tan 36^\circ = \frac{9}{a}$$

$$a \approx 12.4$$



$$A = \frac{1}{2} 12.4 \cdot 90$$

$$557.4 \text{ cm}^2$$

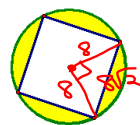
Area of a circle = πr^2 

$$r = 4 \text{ cm}$$

$$A = \pi 4^2$$

$$A = 16\pi \text{ cm}^2$$

Find the area of the shaded region.
The radius is 8 cm.



$$A_{\text{circle}} - A_{\text{square}}$$

$$64\pi - (8\sqrt{2})^2$$

$$64\pi - 128$$

$$73.1 \text{ cm}^2$$